VI. *Extracts of two Letters from the Rev.* Edward Gregory, *M. A. Rector of* Langar, Nottinghamshire, *to the Rev.* Nevil Maskelyne, *D. D. F. R. S. Astronomer Royal; containing an Account of the Discovery of a Comet, with Observations thereon.*

Read February 7, 1793.

Extract of the first Letter, dated Langar, *near* Nottingham, January 10th, 1793.

I TROUBLE you with this letter to communicate to you such observations as I have made of a comet, which I saw on the 8th instant. The evening of the 8th being very clear, I was employed in my observatory, in taking differences of right ascension and declination between the planet Venus and Aquarii, when, happening to look towards the north-west part of the hemisphere, I saw a star of a hazy appearance, and about the size of a star of the second magnitude, in the space between the flexure of the Dragon and the foot of Hercules, larger and brighter than I had before remarked in that part of the heavens; which excited my attention so much, as to induce me to direct such a telescope to it as lets in much light, and is generally used at sea to see objects in the night. This star seemed to have a hazy and indistinct appearance in the telescope, which immediately led me to suspect it might be a comet; but the twilight yet remaining, I was not quite

certain of it. When the night was completely come on, it became evident it was a comet, the coma being of a white light, hazy, and ill defined. I could perceive no nucleus, nor as yet any appearance of a tail.

I waited for, and was fortunate enough to obtain, an observation of its passage over the meridian under the pole, at 4^h 8′ 30″ by EARNSHAW'S clock, or 4^h 6′ 43″ sidereal time; its zenith-distance, by BIRD'S quadrant, being 75° 16′ 16″. The observation of the passage over the meridian was taken by guessing when a hazy dim appearance, about the shape and size of a hen's egg, was in the centre of the field of the transit instrument; any light, however weak, effacing all the light of the comet.

These observations were merely formed from the best judgment I could make by the naked eye, for, as I before observed, the light of the comet was so weak, as not to bear any degree of light sufficient to render visible the wires in the night telescope; which I have mounted on a polar axis, with a proper system of wires to take differences of right ascension and declination.

I continued to watch the comet until three o'clock in the morning, when it had ascended to some considerable altitude; I could perceive with the night telescope a very faint, but yet sufficiently evident tail, and that the comet had moved a few minutes to the west; that is, had increased its right ascension, and also its polar distance. I then observed the comet with other telescopes, of less aperture and deeper powers; in such it appeared a confused white hazy light, nor could I perceive any nucleus or tail, although it was visible in the night-glass, with its direction towards the zenith.

In case you are already apprised of the appearance of this comet, and of course this information is superfluous, I hope you will attribute my giving you this trouble to my eager desire that these extraordinary bodies may be observed with such capital instruments as you are in possession of, and also to shew you, by these attentions, the sense I entertain of the many civilities I have received from you.

I am, &c.

EDWARD GREGORY.

On the 9th I obtained a very imperfect glimpse of the comet, the twilight yet being very considerable, and the air very hazy. The comet has moved considerably westward, and its polar distance, I think, is increased. I thought the tail appeared rather brighter and longer; the coma not altered; no nucleus to be seen. This observation was extremely imperfect, the comet being seen with the night-glass held in my hand, during a space of four or five minutes; the sky, in that part, was cloudless, though most of the surrounding constellations were obscured.

Extract of the second Letter, dated January *25th*, 1793.

THE observations of the comet were taken after the following manner. Finding that any degree of light sufficient to render the wires visible effaced the comet, I brought it, as nearly as I could judge, into the centre of the field without using any light, and then cast light on the illuminator; and in that stage of the process between the comet's disappearing and the wires becoming visible, I trusted to the impression left on the eye for the place of the comet when it vanished; and

I think I could not err more than three or four minutes from its being on the middle horizontal wire, and about as much from the intersection of the vertical, with the middle horizontal wire. But, after all, it is a vain thing to talk of critical exactness in this matter, either in the quadrant or transit observations, under the circumstances I am going to describe to you. The comet, in the telescopes of these instruments, had somewhat the appearance of a hen's egg, seen obliquely, with the large end towards the eye; of a dull white misty light. I could perceive no nucleus, therefore I considered the longest diameter, which was nearly directed towards the east, (but there was hardly any perceivable difference in the diameters) as the line in which, had any nucleus been visible, it would have been found; and I endeavoured, in the manner I have described, to bring this line on the middle horizontal wire, and the brightest part of it up to the vertical wire; and when I thought I had effected this, I read off the divisions on the arch, and noted the time by EARNSHAW's regulator.

On January 21st, I observed the instantaneous immersion of γ Tauri, at $0^h\ 54'\ 22''$ by my clock; and at $2^h\ 3'\ 31''$ I saw it again about a minute's distance from the moon's enlightened limb, the moment of emersion having escaped observation. I had, on the same day, observed the sun's passage over the meridian, by a mean of the wires, at $20^h\ 18'\ 45\frac{1}{3}''$; the clock had been losing a little more than a second a day, for eight or ten weeks past.* The mean of ten observations of the first satellite

* Hence the immersion of the star was at $4^h\ 34'\ 48'',6$, and the first sight of it after the emersion at $5^h\ 43'\ 46''$, apparent time. This may perhaps be useful in determining the longitude of Mr. GREGORY's observatory.—Note by Dr. MASKELYNE.

of Jupiter place me 3′ 47″, in time, west of Greenwich. My latitude, deduced from a great number of observations of the sun and stars, in all the various ways of determining the latitude, with BIRD'S quadrant, HADLEY'S quadrant, and two equatorial instruments, is 52° 54′ 37″ N.

It remains that I relate what I saw of the comet's tail. At 15^h astronomical time of the 8th, or three o'clock civil time in the morning of the 9th, I saw a very faint beam of light extending itself from the coma towards the zenith. When I brought the coma to the centre of the field of the night-glass, which takes in about 7 degrees, it reached to near the circumference of the field, consequently it amounted to about $3\frac{1}{2}$ degrees. I thought it brighter and longer when I had a mere glimpse of the comet in the evening twilight on the 9th. On the 10th, 11th, and 12th, the tail was rather brighter, yet very faint; not broader than a finger, nor brighter than a beam of light let into an ill darkened room for prismatic experiments. It extended itself beyond the circumference, when the coma was in the centre of the night-glass, perhaps a degree, consequently was $4°\frac{1}{2}$ long; it was inclined towards the east, and on the 12th pointed due east at midnight.

On the 11th, the comet passed the middle wire of the transit instrument under the pole, at 8^h 28′ 0″ sidereal time. The zenith distance was 56° 2′ 15″.

I am, &c.

EDWARD GREGORY.